



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

October 16, 2001

The Honorable Edward J. Markey  
United States House of Representatives  
Washington, D.C. 20515-2107

Dear Congressman Markey:

On behalf of the Commission, I am responding to your letter of September 20, 2001, regarding the actions of the U.S. Nuclear Regulatory Commission (NRC) and the nuclear industry in response to the terrorist attacks on September 11, 2001, and your concerns regarding security at nuclear power plants. Although nuclear power plants are among the most hardened and secure civilian facilities in the United States, the recent attacks have focused attention on the need to review policies and practices related to safeguards and physical security measures for civilian nuclear facilities.

Immediately following the terrorist attacks on the World Trade Center and the Pentagon, the NRC advised nuclear power plant licensees to go to the highest level of security, and all promptly did so. With continued uncertainty about the possibility of additional terrorist activities, the Nation's nuclear power plants remain at the highest level of security and the NRC continues to monitor the situation. For the longer term, I, with the full support of the Commission, have directed the NRC staff to thoroughly reevaluate the NRC's safeguards and physical security programs. This reevaluation will be a top-to-bottom analysis involving all aspects of the Agency's safeguards and physical security programs.

Given the nature of the attacks on September 11, the identification of any necessary adjustments to the safeguards and physical security measures for civilian nuclear facilities must involve consultation and coordination with other U.S. national security organizations. The NRC is currently interacting with the Federal Bureau of Investigation, other intelligence and law enforcement agencies, and the Department of Defense to ensure any changes to the NRC's programs are informed by pertinent information from other relevant U.S. agencies.

Because the NRC's reevaluation is ongoing, the enclosed answers to your questions are founded on the information that is available at this time. The Commission appreciates your concern. If you have further comments or questions, please feel free to contact me.

Sincerely,

Richard A. Meserve

Enclosure: Responses to Questions

## RESPONSES TO QUESTIONS

Question 1:                    *Why did NRC choose to issue a "recommendation" [per Threat Advisory on September 11, 2001, and Information Notice 98-35] instead of an "order"?*

Answer:

All licensees have a continuing regulatory obligation to be able to defend against the Design Basis Threat. A Threat Advisory does not change this fundamental obligation, but merely provides a vehicle to advise licensees to be especially vigilant. Information Notice 98-35, "Threat Assessments and Consideration of Heightened Physical Protection Measures," issued on September 4, 1998, provides information to licensees as to how to respond to a NRC designation of a particular security level in a Threat Advisory. In essence, the Information Notice and a Threat Advisory provide a vehicle to facilitate communication between the NRC and its licensees when rapid actions are required. Forwarding the Threat Advisory on September 11, 2001, and referring to the Security Level 3 measures in the already-distributed Information Notice, allowed quick action on the part of the licensees to respond to the threat environment.

A Threat Advisory serves a different purpose than an order. Issuing an order, rather than a Threat Advisory, would have consumed time and resources and would have been no more effective in achieving the desired result. Nonetheless, the NRC retains the authority to issue orders requiring specific actions by all, or some, of its licensees. The staff has reviewed the actions taken by the licensees as a result of the Threat Advisory of September 11 and concluded that no additional actions were necessary at that time.

Question 2:                    *How many plants acted to implement the increase to the highest level of security that you recommended? Which plants? What steps did they take? How long do they plan to maintain the elevated level of security? Which plants did not choose to go to the highest level of security and why?*

Answer:

All relevant NRC licensees implemented a heightened security stance, as the NRC advised. The steps generally included increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with law enforcement and military authorities, and limited access of personnel and vehicles to the site, among other measures. On October 6, the NRC issued a safeguards advisory delineating certain prompt and longer-term additional actions to strengthen licensee capability to respond to a terrorist attack at or beyond the design basis threat. Licensees are currently implementing those actions.

All relevant licensees remain at an elevated security posture. The NRC is coordinating with the Federal Bureau of Investigation, other intelligence and law enforcement agencies, and the Department of Defense to continue to assess the threats and ensure that licensees maintain

the appropriate security level. The results of the ongoing assessments will inform NRC's decisions regarding adjustments in the recommended level of security.

Question 3: *Is the NRC considering mandating changes in security at nuclear power plants? If not, why not? If yes, what will these changes be? Will these changes be permanent, or will they be in place for a limited period of time?*

Answer:

In light of the attacks on September 11, and in response to a tasking memo from the Chairman to the Executive Director for Operations, the staff will undertake a comprehensive review of the NRC's existing regulations and proposed revisions and provide additional recommendations to the Commission. It is premature to predict what changes will be proposed.

Question 4(a): *Did the Canadian and Russian response to the events of September 11, 2001, [relative to their nuclear power plants] constitute a greater or lesser increase in security than the measures recommended by the NRC for American nuclear power plants?*

Answer:

The Commission believes that the baseline security level at U.S. commercial nuclear reactors is very high compared with most other nations. Indeed, many foreign regulators often comment on the impressive security measures and large guard forces evident when they visit our nuclear power plants. We are aware of no other regulator who systematically carries out security inspections involving force-on-force exercises. We understand the Canadian facilities instituted a number of measures in light of the September 11 attacks. Specific details concerning security at Canadian power reactor facilities constitute sensitive information.

The NRC has not exchanged information with the Russian government that would enable an assessment of the security at Russian nuclear power plants.

Question 4(b): *What is the expected time duration of the Canadian and Russian measures?*

Answer:

We do not know the duration of heightened security measures in Canada and Russia.

Question 5: *Would the NRC seek to modify the design-basis threat assumptions to include adversaries willing to commit suicide in their attack?*

Answer:

The NRC has routinely monitored the threat environment since the creation of the design basis threat (DBT) statements in the late 1970s. The willingness of terrorists, or others, to commit

suicide in the course of some criminal act, is an underlying assumption of the DBT and this is not considered to be a new adversary characteristic. The working assumption described in the DBT is that the adversary force is willing to kill or be killed in an attempt to complete its attack. However, the NRC will consider the information developed as a result of the September 11, 2001, event in determining potential adjustments to the DBT.

Question 6(a): *Is the NRC going to reconsider plans to replace the OSRE program with a nuclear industry-designed and managed program to test the adequacy of security measures at individual power plants?*

Answer:

The NRC has not made a decision to terminate the OSRE program. Before September 11, the Commission agreed to a pilot of the industry-designed Safeguards Performance Assessment (SPA) program. That pilot, which is subject to NRC oversight, would be evaluated after one year.

During the conduct of the SPA pilot, the NRC would continue OSRE inspections at a rate of six per year, which would be combined with eight NRC-evaluated SPA inspections. A final Commission decision regarding the method of conducting force-on-force testing would follow formal evaluation of lessons learned during the pilot program and the continuing OSRE program. As a result of the Chairman's tasking memorandum following the September 11 attacks, the entirety of the inspection program will be reexamined.

Question 6(b): *Instead of eliminating the OSRE program, will the NRC consider making OSRE tests more rigorous, with attacking teams more heavily armed than the specifications listed under 10 CFR 73.1?*

Answer:

As directed by the Chairman's tasking memorandum, both the Design Basis Threat and the inspection program will be reexamined.

Question 7: A quick search of the Web turned up a guideline from the Swiss Federal Nuclear Safety Inspectorate (HSK), Guideline HSK-R-102, "Design Criteria for the Protection of Safety Equipment in Nuclear Power Stations Against the Consequences of Airplane Crash." Does the NRC have any design criteria for protection against airplane crashes? If not, why not? If so, does it apply only at plants located within a certain range from airports? If so, why was it not applied to plants all over the country? A recent press report mentioned in passing that nuclear power plant containment vessels are "designed to survive the crash of a falling 747." Where can this specification be found?

Answer:

The Swiss guideline requires that "nuclear power stations shall be protected against the consequences of an airplane crash." The intent is to ensure that "the radiation exposure of the public shall not exceed the limits specified." We understand that the Swiss guideline reflects the heavy density of airline traffic over Switzerland.

The NRC has not routinely required all plants to be designed to withstand a particular aircraft crash, but such considerations have entered into siting evaluations. Those evaluations have considered the probability of accidental air crashes as a screening criterion to determine whether further evaluation is required. Specifically, 10 CFR 100.10, "Factors To Be Considered When Evaluating Sites," requires, in part, that "reactors will reflect through their design, construction, and operation an extremely low probability for accidents that could result in release of significant quantities of radioactive fission products." In addition, for applications after January 10, 1997, 10 CFR 100.20(b) requires that "the nature and proximity of man-related hazards (e.g., airports, dams, transportation routes, military and chemical facilities) must be evaluated to establish site parameters for use in determining whether a plant design can accommodate commonly occurring hazards, and whether the risk of other hazards is very low."

The NRC issued NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 3.5.1.6, "Aircraft Hazards" (dated July 1981) that defines the Agency's acceptance criteria for siting nuclear power plants near airports and/or airways. The probability of an accidental aircraft crash resulting in radiological consequences greater than the exposure guidelines defined by 10 CFR Part 100 is considered to be acceptably low if the plant meets specified criteria regarding distance from airports, holding patterns, and approach patterns, as well as criteria regarding volumes of air traffic. If the plant does not meet these criteria, a detailed review of accidental aircraft hazards must be performed. If that detailed hazard review cannot demonstrate an acceptably low probability of an aircraft accident resulting in radiological consequences greater than the exposure guidelines defined by 10 CFR Part 100, engineering analyses of aircraft impacts are required. The probability is considered to be acceptably low if the probability, based on a realistic assessment, is less than about  $10^{-7}$  per year (or  $10^{-6}$  per year given a conservative assessment).

If the plant cannot meet the probability criteria; the plant's structures, systems, and components must be designed to withstand the effects of the postulated aircraft impacts and fires without loss of safe shutdown capability, and without a release of radioactivity that would exceed the exposure guidelines defined by 10 CFR Part 100.

The NRC has no criterion that requires nuclear power plant containment vessels to be designed to survive the crash of a falling Boeing 747.

Question 8:

*A probabilistic risk assessment in the journal Nuclear Safety of airplane impacts on nuclear power plants yielded a very small probability ( $4.6 \times 10^{-5}$  %) for the impact of a large airplane (greater than 12,500 lbs) onto a plant that is more than 5 miles away from an airport. But this is assuming an accidental impact. In light of the events on September 11, it is clear that deliberate impacts must be considered. With a capable pilot*

*committed to a terrorist attack on a nuclear power plant at the controls, the probability of impact is 100%. What would be the result of a Boeing 767 with a full tank making a direct impact onto a nuclear power plant at full speed? What would be the result of other aircraft, larger or smaller, impacting a nuclear power plant at full speed? Please fully assess the different circumstances of aircraft impacting the containment vessel as well as other reactor support facilities, and consider such factors as full or empty fuel tanks and large or small aircraft.*

Answer:

Nuclear power plants have an inherent capability to protect public health and safety through such features as robust containment buildings, redundant safety systems, highly trained operators. These plants are among the most hardened structures in the country and are designed to withstand extreme events, such as hurricanes, tornadoes, and earthquakes. In addition, all NRC licensees with significant radiological material have emergency response plans to mitigate impacts on the public in the event of a release. However, the NRC did not specifically consider attacks by aircraft such as Boeing 757s or 767s, and nuclear power plants were not specifically designed to withstand such crashes. The NRC has not yet performed detailed engineering analyses of a large airliner crash; and thus cannot, at this point, provide an assessment of the likely consequences of such an attack.

The NRC staff is evaluating strategies to assess the effects of a deliberate aircraft impact and the resulting fire and explosion on the reactor containment building and other reactor support facilities. Variables considered in the analyses will include aircraft size and speed, as well as the amount of fuel.

Question 9:

*Will the NRC revise its estimates of the likelihood of attacks by aircraft hitting nuclear waste transportation containers or nuclear waste storage facilities, and require licensees to undertake further preparations for such attacks?*

Answer:

As discussed in response to Question 7, above, the previous NRC estimates were based on an accidental airplane crash, not an intentional crash. In response to the terrorist attack of September 11, 2001, the NRC has begun a thorough review of the safeguards and physical security programs. This effort will include input from the national security organizations, the FBI, intelligence and law enforcement agencies, the Department of Defense and others to evaluate the level of threat to which civilian nuclear facilities must be able to respond. It will also consider the results of discussions with these agencies on how to deal with threats beyond the design basis, such as enemy-of-the-state threats.

Question 10(a):      *What would happen to spent fuel storage casks if they were subjected to a fire for a full day?*

Answer:

The capacity of spent fuel dry storage casks to withstand a fire for extended time, such as 24 hours, has not been analyzed, given the very low probability that firefighting personnel would be unable to respond within 24 hours. However, previous studies have analyzed worst case impact conditions for aircraft accidents, and these studies have found that most of the aircraft fuel would be dispersed and will burn off in a matter of minutes. Thus, if impacted by a large commercial aircraft, a spent fuel storage cask would not be expected to be appreciably affected by a fire. However, if, as a result of the NRC's review of the terrorist events of September 11, 2001, the NRC determines that additional or revised safety or physical protection actions or requirements need to be taken at independent spent fuel storage installations, the NRC will take appropriate actions to implement those measures.

Question 10(b):      *If the protective covering of the cask were burned away, what would happen to the fuel inside?*

Answer:

The concrete and/or steel protective coverings are not readily flammable and will not be burned away. Therefore, the staff believes that a fire will not result in failure of the inner canister. As indicated above, if, as a result of the NRC's review of the terrorist events of September 11, 2001, the NRC determines that additional or revised safety or physical protection actions or requirements need to be taken at independent spent fuel storage installations, the NRC will take appropriate actions to implement those measures.

Question 10(c):      *Could we have a Chernobyl-style accident, where the fire carried radioactive materials into the air [from a spent fuel storage cask]?*

Answer:

No. Even if a spent fuel storage cask were impacted and penetrated by a commercial aircraft, the resultant effects could never be equivalent to a Chernobyl-type accident because the amount of radioactive material contained within the cask is orders of magnitude less than in an operating reactor, and the mechanisms for dispersal of the material are fewer than were present during the Chernobyl accident. In the event of a crash of a large commercial aircraft, and if the cask were breached, we could not exclude the possibility of localized impacts.

Question 10(d)      *Will there be a redesign of spent fuel casks? Why or why not?*

Answer:

As previously stated, if, as a result of the NRC's review of the terrorist events of September 11, 2001, the NRC determines that additional or revised safety or physical protection actions need to be taken or new requirements implemented at independent spent fuel storage installations,

including the design requirements for spent fuel casks, the NRC will take appropriate actions to implement those measures.

Question 11:      *The possibility of severe damage due to a fire at a nuclear power plant has been considered in the past. As discussed above, passive barriers in the plants are rated to withstand fires for 1 or 3 hours. Were the specifications made with the crash of a commercial airliner in mind? What changes will you make to the length of time that passive fire barriers need to resist a fire?*

Answer:

The objective of the NRC's current fire protection requirements is to ensure that a single internal fire event does not adversely affect the ability of the plant to achieve and maintain safe shutdown. Fire barriers are only one of the many elements of the defense-in-depth principle that is applied to nuclear power plant fire protection; therefore, licensees do not solely rely on installed fire barriers to achieve and maintain safe shutdown. The specifications for the qualifications of fire barriers installed in nuclear power plants to meet the NRC's objective are founded on the testing protocol described by the American Society of Testing Materials, Standard Test Methods for Fire Tests of Building Construction and Materials (ASTM E-119). This standard is used to measure and describe the properties of fire barrier materials under controlled laboratory conditions. This standard is widely used as the basis for rating the fire barriers that are used in many types of industrial facilities besides nuclear power plants. Increasing the length of time required for passive barriers installed at a nuclear power plant to resist a laboratory fire would not ensure that the fire barriers would be able to protect important safety systems, because the scenario in which a commercial airliner impacts and penetrates a structure would likely also damage the fire barriers as a result of the impact of debris from the aircraft or the damaged structure. Therefore, changes to the length of time that passive barriers need to resist a fire would not, by themselves, be an effective means of addressing the aircraft crash threat.

Question 12:      *What is the current status of NRC actions to make potassium iodide available to communities surrounding nuclear power plants, so that in the event of a successful terrorist attack against a U.S. nuclear facility, it could be quickly distributed to local populations? What is the NRC doing to expedite the distribution of sufficient stockpiles of potassium iodide?*

Answer:

In January 2001, the NRC revised a portion of its emergency response regulations to require that consideration be given to including potassium iodide (KI) as a protective measure for the general public to supplement sheltering and evacuation in the event of a severe nuclear power plant accident. In doing so, the Commission found that KI is a reasonable, prudent, and inexpensive supplement to evacuation and sheltering for specific local conditions. The Commission left it to the States to make a final decision on the use of KI as a supplemental measure. But the Commission decided to fund the initial purchases of KI for any State making



a decision to stockpile KI. NRC set aside \$400,000 in FY 2001 and has requested similar funding in FY 2002 to purchase KI.

Together with the Federal Emergency Management Agency (FEMA), the NRC has formed a subcommittee to develop and implement a program to distribute potassium iodide (KI) to States which decide to include KI in their range of public protective actions. The use of KI would supplement other protective measures, such as evacuation and sheltering. The NRC/FEMA KI subcommittee has been meeting approximately monthly since January 2001 to develop procedures, processes, and guidance for KI program implementation. Presently, the subcommittee is awaiting the issuance of final Food and Drug Administration (FDA) guidance on dosage and intervention levels, which are needed to complete the NRC KI distribution program. FDA published its draft guidance in January 2001.

The NRC formally requested that a Federal Radiological Protection Coordinating Committee (FRPCC) subcommittee on KI be formed with representatives from the FDA and the Environmental Protection Agency (EPA), as well as the NRC and FEMA. The purpose of the FRPCC KI subcommittee is to expedite review and revision of the Federal KI policy, encourage the finalization of FDA guidance, and coordinate KI implementation issues. That subcommittee had its initial meeting on September 25, 2001. Additionally, as the NRC requested through the FRPCC, FEMA Director Allbaugh sent a letter to the U.S. Department of Health and Human Services (HHS) Secretary Thompson requesting expedited review of the FDA guidance on the use of KI.

The FRPCC KI subcommittee is being used as a forum to discuss and develop recommendations for consideration by the member agencies regarding the impact of the September 11 events on the Federal KI policy, and KI stockpiling and distribution issues. At present, the NRC intends to proceed with implementing its KI distribution program for States that decide to include KI in their range of public protective actions once the FDA guidance is finalized.

Question 13:

*In light of last week's events, will the NRC now reconsider its previous support for allowing foreign entities to acquire nuclear power plant operating licenses? Does the NRC foresee any increase in prospective security risks associated with having foreign entities own or control a nuclear facility? If not, why not?*

Answer:

The reasons that the NRC has given Congress for removing the statutory ban on foreign ownership of nuclear power operating licenses remain sound in our view. The current ban in Sections 103d and 104d of the Atomic Energy Act of 1954 (AEA) is unqualified. It applies to all foreign entities, making no distinction between friend, such as the United Kingdom, and foe, such as Iraq. Moreover, the ban fails to accomplish its primary goal of preventing transfer of nuclear power technology because, unlike in 1946 when the statutory ban went into effect, nuclear power technology is well known abroad. In the absence of the ban, there would still be ample protection against an inappropriate licensee because the Commission would still be prohibited from issuing any operating license to a foreign entity if the foreign ownership would

be inimical to the common defense and security or the health and safety of the public. Before making such a determination, the Commission would be able to obtain the views of the Executive Branch.

Question 14(a):      *What action, if any, has the NRC taken to evaluate the possibility of "insider threats" to nuclear power plants by members of any terrorist organizations?*

Answer:

Since September 11, 2001, the FBI has provided to the NRC frequently updated lists of individuals who may have ties or information related to terrorist activities. At the request of the FBI, the NRC provided these lists to the nuclear power plants, the nonpower reactor facilities, decommissioning plants, and selected fuel facilities to be checked against utility employment and visitor records. The Nuclear Energy Institute has also been provided the lists to be checked against a database of temporary nuclear utility workers. All results are being provided by NRC to the FBI for resolution. To date, all potential matches have been resolved through the FBI.

Question 14(b):      *Who can work at nuclear power plants?*

Answer:

In order to be authorized for unescorted access at a nuclear power plant, an individual must undergo a background screening and investigation pursuant to 10 CFR 73.56, and such workers are subject to ongoing fitness-for-duty requirements. The screening criteria include: (1) a background investigation designed to identify past actions which are indicative of an individual's future reliability within a protected or vital area of a nuclear power reactor; (2) a psychological assessment designed to evaluate the possible impact of any noted psychological characteristics which may have a bearing on trustworthiness and reliability; and (3) behavioral observations, conducted by supervisors and management personnel, designed to detect individual behavioral changes which, if left unattended, could lead to acts detrimental to the public health and safety.

Question 14(c):      *What sort of background checks are performed as a condition of employment?*

Answer:

As noted above, there are requirements for background screening and investigation before authorizing an individual to have unescorted access to the site. In accordance with 10 CFR 73.56, the background investigation includes employment history, education history, criminal history, military service, and credit history, as well as a psychological evaluation, interview of developed references, and fitness-for-duty testing. With and without authorization for unescorted access, all individuals working inside the licensee's protected area are subject to continued behavioral observation, as required by 10 CFR 73.56, to identify aberrant behavior or other indications that the individual is, or has become, untrustworthy.

Question 14(d):

*Do employees [at nuclear power plants] have to be permanent residents or citizens of the U.S.?*

Answer:

Employees at nuclear power plants do not have to be permanent residents or citizens of the United States.

Question 15:

*Does the NRC believe that any new measures are needed to tighten up export controls relating to nuclear materials and nuclear technology, so that such materials and technology do not end up in terrorist hands? If not, why not, and if so, what new measures are necessary?*

Answer:

The NRC's export licensing regulations, including the related decision criteria, are founded on explicit provisions of the Atomic Energy Act of 1954, as amended by the Nuclear Non-Proliferation Act of 1978, the Energy Policy Act of 1992, and other acts. These provisions place strict controls on U.S. exports of nuclear materials and other materials and equipment of significance for nuclear explosive purposes. To date, the NRC's licensing specialists have not identified any of these provisions that should be changed in light of increased concerns about terrorist attacks.

From a broader perspective, the NRC's export regulations are only one of several facets of U.S. and multilateral export controls. The Agency anticipates and is prepared to participate in, interagency reviews involving Executive Branch agencies (such as the Departments of State, Energy, Commerce, Defense, and Transportation) to address those controls that bear on terrorist intentions and acts. The Agency will also support U.S. Government efforts in the Nuclear Suppliers Group and the International Atomic Energy Agency.

Question 16:

*10 CFR 50.13 provides that nuclear power plants do not need to be protected "against the effects of (a) attacks and destructive acts, including sabotage, directed against the facility by an enemy of the United States, whether a foreign government or other person..." Since the U.S. is preparing for a war on terrorism, I am concerned that the industry will insist that they do not need to provide defense against any terrorist attacks. Ray Golden, San Onofre business manager for Southern California Edison, recently stated, "We would characterize (the terrorist attacks) as President Bush did." He further states, "We are not certain what could happen to the plant from that type of event, and we cannot protect completely against it. Nor, from a security standpoint, are we required to." In light of the attacks on September 11, do you believe that it is appropriate to change in any way the responsibilities of the NRC and the industry to take appropriate measures to protect the public from the consequences of acts of terrorism directed against nuclear power plants? Why or why not?*

Answer:

The NRC cannot determine at this time what changes may be appropriate regarding the responsibilities of the industry to protect against acts of terrorism and the responsibilities of our homeland security agencies. The NRC has started a full review of its security standards, and that review may bring to light some need to change the division of responsibilities between the government and the private sector. Moreover, our interactions with the newly established Office of Homeland Security and other agencies should help to further clarify where the lines between the industry's responsibilities and the national government's should be drawn.

At present, consistent with 10 CFR 50.13, licensees are not required to protect against offensive military actions by foreign governments (such as aircraft attacks). Such actions have ramifications for the Nation's security (not only the security of an individual facility) and, as a practical matter, may be beyond the defensive capability of private organizations. Protection against these types of attacks may be more appropriately the responsibility of the national defense establishment. On the other hand, 10 CFR 73.1(a)(1) requires that licensees must protect against violent actions by well-trained and well-equipped persons, even those who are supported by a foreign government, if these activities (for example, vehicle bombings) could also be carried out domestically.